EMERGENCY AIRWORTHINESS DIRECTIVE

Aircraft Certification Service
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**Federal Aviation
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DATE: November 23, 2002
AD #: 2002-24-51

Transmitted as follows is emergency airworthiness directive (AD) 2002-24-51, for the attention of all owners and operators of all Boeing Model 737-600, -700, -700C, –800, and -900 series airplanes; Model 747 series airplanes; and Model 757 series airplanes.

Background

The FAA has received reports indicating that two fuel tank pumps from different Model 747 series airplanes showed evidence of extreme localized overheating of parts in the priming and vapor pump section of the fuel pump. The priming and vapor pump section of the pump is open to the fuel tank via the pump inlet line and the vapor vent of the pump. The cause of this overheating is believed to be friction between the pump parts; however, the specific cause of the friction is unknown at this time.

One of the two pumps was an override/jettison pump of the inboard main tank. The pump had been removed so that X-ray inspections specified in AD 2002-19-52, amendment 39-12900 (67 FR 61253, September 30, 2002), could be performed. The pump had been installed on the airplane for 6,000 flight hours. Since scoring was found on the inducer housing of the pump, the pump was disassembled, at which time evidence of severe overheating of the priming and vapor pump section was found. The Stellite (cobalt/chrome/nickel/iron alloy) end plates of the priming and vapor section of the pump were blued and cracked from thermal stress, and the steel pump shaft in that same area was also blued. According to the pump manufacturer, bluing of the steel and/or Stellite materials is evidence of temperatures in excess of 1,100 degrees Fahrenheit. It is believed that such temperatures could only be reached during dry running of the pump. The previous operational history of this pump is under investigation to determine how dry running could have occurred. Adjacent areas of the shaft were blackened. In addition, the aluminum bearing housing adjacent to the back side of the end plate had melted.

The other pump was an override/jettison pump of the center tank, which had been removed from a Model 747-400 series airplane due to a low pressure warning received in the flight deck. The pump had been installed on the airplane for 3,500 flight hours. The pump was found with the thermal fuses of the electrical motor winding open, which indicates an overheat condition in the motor section. Such overheating may be due to the pump rotor dragging or locking. Evidence of severe overheating of the priming and vapor pump section was found. The end plates of the priming and vapor section of the pump were blued and cracked from thermal stress, and the pump shaft in that same area was blued.

Such overheating of the parts in the priming and vapor pump section of the fuel pump provides an ignition source in the fuel tank during dry running of the pump, which could result in fire/explosion of the fuel tank.

Similar Parts

The pumps involved in the two reports described previously have the same part numbers as those that were addressed in AD 2002-19-52. The fuel pumps installed on Model 737-600, -700, -700C, -800, and –900; Model 747; and Model 757 series airplanes are all potentially affected since the pumps are almost identical in design.

FAA's Determination

In light of these reports, we find that procedures must be included in the Airplane Flight Manual (AFM) to require the flightcrew to maintain certain minimum fuel levels in the center fuel tanks, and to prohibit the use of the horizontal stabilizer fuel tank (for Model 747-400 series airplanes) and certain center auxiliary fuel tanks (on Model 747 series airplanes). Those procedures specify crew monitoring of fuel levels and shutoff of center fuel tank pumps at specified levels that ensure the pump inlet remains covered during pump operation. Covering the pump inlet prevents fuel vapors from coming into contact with potentially overheated parts in the priming and vapor pump section of the fuel pump, and likely prevents the overheating condition itself. Those procedures also require deactivation of the horizontal stabilizer tank on Model 747-400 series airplanes and certain auxiliary fuel tanks of Model 747 series airplanes because the small size of the tank and the high flow rate of the pumps make it impractical to effectively apply an early shutoff procedure.

Explanation of the Requirements of the Rule

Since an unsafe condition has been identified that is likely to exist or develop on other airplanes of this same type design, this airworthiness directive is issued to require revising the AFM to require the flightcrew to maintain certain minimum fuel levels in the center fuel tanks, and to prohibit the use of the horizontal stabilizer fuel tank (for Model 747-400 series airplanes) and certain center auxiliary fuel tanks (on Model 747 series airplanes).

Some operators may already have accomplished the AFM revisions required by this AD since those revisions are identical to the AFM revisions required by AD 2002-19-52. However, the terminating action (i.e., X-ray inspections of the fuel pumps) provided by AD 2002-19-52 allows operators to remove those AFM revisions. The unsafe condition addressed in AD 2002-19-52 was caused by chafed wiring, so the terminating action for that AD is not effective in eliminating the unsafe condition addressed in this AD. Therefore, for operators that have accomplished the terminating action specified in AD 2002-19-52, this new AD requires that those AFM revisions be reinstated.

Interim Action

This is considered to be interim action until final action is identified, at which time the FAA may consider further rulemaking.

Determination of Rule's Effective Date

Since a situation exists that requires the immediate adoption of this regulation, it is found that notice and opportunity for prior public comment hereon are impracticable, and that good cause exists for making this AD effective in less than 30 days.

This rule is issued under 49 U.S.C. Section 44701 (formerly section 601 of the Federal Aviation Act of 1958) pursuant to the authority delegated to me by the Administrator, and is effective immediately upon receipt of this AD.

2002-24-51 BOEING: Docket No. 2002-NM-309-AD.

Applicability: All Boeing Model 737-600, -700, -700C, –800, and -900 series airplanes; Model 747 series airplanes; and Model 757 series airplanes; certificated in any category.

Compliance: Required as indicated, unless accomplished previously.

To require the flightcrew to maintain certain minimum fuel levels in the center fuel tanks, and to prohibit the use of the horizontal stabilizer fuel tank (for Model 747-400 series airplanes) and certain center auxiliary fuel tanks (on Model 747 series airplanes), accomplish the following:

NOTE 1: Accomplishment of the actions required by paragraphs (a) through (d) of AD 2002-19-52, amendment 39-12900, is acceptable for compliance with the requirements of paragraphs (b) through (e) of this AD. This AD does not require that those actions be repeated unless the terminating actions specified in paragraphs (g) and (h) of AD 2002-19-52 have been accomplished and the AFM revisions and placard(s) have been removed.

(a) Accomplishment of the terminating actions specified in paragraphs (g) and (h) of AD 2002-19-52, amendment 39-12900, does not allow removal of the AFM revisions required by paragraphs (a), (b), (c), and (d) of AD 2002-19-52, or paragraphs (b), (c), (d), and (e) of this AD.

Airplane Flight Manual (AFM) Revision: Model 737-600, -700, -700C, -800, and -900

(b) For Model 737-600, -700, -700C, -800, and –900 series airplanes: Within 4 days after receipt of this AD, revise the Limitations Section of the AFM to include the following (this may be accomplished by inserting a copy of this AD into the AFM):

"CERTIFICATE LIMITATIONS

The center tank fuel pumps must be OFF for takeoff if center tank fuel is less than 5,000 pounds (2,300 kilograms) with the airplane readied for initial taxi.

Both center tank fuel pump switches must be selected OFF when center tank fuel quantity reaches approximately 1,000 pounds (500 kilograms) during climb and cruise or 3,000 pounds (1,400 kilograms) during descent and landing. The fuel pumps must be positioned OFF at the first indication of fuel pump low pressure.

The CWT fuel quantity indication system must be operative to dispatch with CWT mission fuel.

Note

The CONFIG indicator will annunciate when center tank fuel exceeds 1,600 pounds (800 kilograms) and the center tank fuel pump switches are OFF. Do not accomplish the CONFIG non-normal procedure prior to or during takeoff with less than 5,000 pounds (2,300 kilograms) of center tank fuel or during descent and landing with less than 3,000 pounds (1,400 kilograms) of center tank fuel.

Note

In a low fuel situation, both center tank pumps may be selected ON and all center tank fuel may be used.

If the main tanks are not full, the zero fuel gross weight of the airplane plus the weight of center tank fuel may exceed the maximum zero fuel gross weight by up to 5,000 pounds (2,300 kilograms) for takeoff, climb and cruise and up to 3,000 pounds (1,400 kilograms) for descent and landing, provided that the effects of balance (CG) have been considered.

If a center tank fuel pump fails with fuel in the center tank, accomplish the FUEL PUMP LOW PRESSURE non-normal procedure.

When defueling center or main wing tanks, the Fuel Pump Low Pressure indication lights must be monitored and the fuel pumps positioned to OFF at the first indication of fuel pump low pressure. Defueling with passengers on board is prohibited.

The limitations contained in this AD supersede any conflicting basic airplane flight manual limitations."

AFM Revision: Model 747-100, -200B, -200F, -200C, -100B, -300, -100B SUD, 747SR, and 747SP

(c) For Model 747-100, -200B, -200F, -200C, -100B, -300, -100B SUD, 747SR, and 747SP series airplanes: Within 4 days after receipt of this AD, revise the Limitations Section of the AFM to include the following (this may be accomplished by inserting a copy of this AD into the AFM):

"CERTIFICATE LIMITATIONS

Fueling and use of the center auxiliary fuel tank and auxiliary fuel tanks 1 and 4 (if installed) is prohibited.

The center wing tank (CWT) must contain a minimum of 17,000 pounds (7,700 kilograms) of fuel prior to engine start, if the CWT override/jettison pumps are to be selected ON during flight.

The CWT fuel quantity indication system must be operative to dispatch with CWT mission fuel.

Both CWT override/jettison pump switches must be selected OFF at or before the CWT fuel quantity reaches 7,000 pounds (3,200 kilograms), if the CWT fuel quantity is less than 50,000 pounds (22,700 kilograms) prior to engine start. The CWT override pumps may be selected ON during stabilized cruise conditions. Both CWT override/jettison pump switches must be selected OFF at or before the CWT fuel quantity reaches 3,000 pounds (1,400 kilograms).

Both CWT override/jettison pump switches must be selected OFF at or before the CWT fuel quantity reaches 3,000 pounds (1,400 kilograms), if the CWT fuel quantity is greater than or equal to 50,000 pounds (22,700 kilograms) prior to engine start.

Both CWT override/jettison pumps must be selected OFF when either CWT override/jettison fuel pump low pressure light illuminates.

Warning

Do not reset a tripped fuel pump circuit breaker.

Warning

Do not cycle the CWT pump switches from ON to OFF to ON with any continuous low pressure indication present.

Note

The CWT may be emptied normally in an emergency fuel jettison.

Note

In a low fuel situation, both CWT override/jettison pumps may be selected ON and all CWT fuel may be used.

If a center wing tank pump fails with fuel in the center tank, shut off the affected fuel pump.

If the main tanks are not full, the zero fuel gross weight of the airplane plus the weight of CWT tank fuel may exceed the maximum zero fuel gross weight by up to 7,000 pounds (3,200 kilograms) for takeoff, climb, cruise, descent, and landing, provided that the effects of balance (CG) have been considered.

When defueling center or main wing tanks, the Fuel Pump Low Pressure indication lights must be monitored and the fuel pumps positioned to OFF at the first indication of fuel pump low pressure. Defueling with passengers on board is prohibited.

The limitations contained in this AD supersede any conflicting basic airplane flight manual limitations."

AFM Revision: Model 747-400, -400D, and –400F

(d) For Model 747-400, -400D, and –400F series airplanes: Within 4 days after receipt of this AD, revise the Limitations Section of the AFM to include the following (this may be accomplished by inserting a copy of this AD into the AFM):

"CERTIFICATE LIMITATIONS

Fueling and use of the horizontal stabilizer tank (if installed) is prohibited if a placard prohibiting its use is installed.

The center wing tank (CWT) must contain a minimum of 17,000 pounds (7,700 kilograms) prior to engine start, if the CWT override/jettison pumps are to be selected ON during flight.

The CWT fuel quantity indication system must be operative to dispatch with CWT mission fuel.

Both CWT override/jettison pump switches must be selected OFF at or before CWT fuel quantity reaches 7,000 pounds (3,200 kilograms), if CWT fuel quantity is less than 50,000 pounds (22,700 kilograms) prior to engine start. The CWT override pumps may be selected ON during stabilized cruise conditions. Both CWT override/jettison pump switches must be selected OFF at or before the CWT fuel quantity reaches 3,000 pounds (1,400 kilograms).

Note

With CWT override/jettison pumps selected OFF and CWT fuel quantity greater than 6,000 pounds (2,800 kilograms), the FUEL OVRD CTR L & R EICAS messages will be displayed. Do not accomplish the associated non-normal procedure.

Both CWT override/jettison pump switches must be selected OFF at or before CWT fuel quantity reaches 3,000 pounds (1,400 kilograms), if CWT fuel quantity is greater than or equal to 50,000 pounds (22,700 kilograms) prior to engine start.

Both CWT override/jettison pumps must be selected OFF when either CWT override/jettison fuel pump low pressure light illuminates.

Warning

Do not reset a tripped fuel pump circuit breaker.

Warning

Do not cycle CWT override/jettison pump switches from ON to OFF to ON with any continuous low pressure indication present.

Note

The center wing tank may be emptied normally during an emergency fuel jettison.

Note

In a low fuel situation, both CWT override/jettison pumps may be selected ON and all CWT fuel may be used.

If a center wing tank pump fails with fuel in the center tank, accomplish the FUEL OVRD CTR L, R non-normal procedure.

If the main tanks are not full, the zero fuel gross weight of the airplane plus the weight of CWT tank fuel may exceed the maximum zero fuel gross weight by up to 7,000 pounds (3,200 kilograms) for takeoff, climb, cruise, descent, and landing, provided that the effects of balance (CG) have been considered.

When defueling any fuel tanks, the Fuel Pump Low Pressure indication lights must be monitored and the fuel pumps positioned to OFF at the first indication of fuel pump low pressure. Defueling with passengers on board is prohibited.

The limitations contained in this AD supersede any conflicting basic airplane flight manual limitations."

AFM Revision: Model 757

(e) For Model 757 series airplanes: Within 4 days after receipt of this AD, revise the Limitations Section of the AFM to include the following (this may be accomplished by inserting a copy of this AD into the AFM):

"CERTIFICATE LIMITATIONS

The center tank fuel pumps must be OFF for takeoff if center tank fuel is less than 5,000 pounds (2,300 kilograms) with the airplane readied for initial taxi.

Both center tank fuel pump switches must be selected OFF when center tank fuel quantity reaches approximately 1,000 pounds (500 kilograms) during climb, cruise, or descent.

The center tank fuel pumps must be positioned OFF at the first indication of fuel pump low pressure.

The CWT fuel quantity indication system must be operative to dispatch with CWT mission fuel.

Warning

Do not reset a tripped fuel pump circuit breaker.

Note

The FUEL CONFIG light will illuminate when there is fuel in the center tank that exceeds 1,200 pounds (600 kilograms) and the center tank fuel pump switches are OFF. Do not accomplish the associated non-normal procedure prior to or during takeoff with less than 5,000 pounds (2,300 kilograms) of center tank fuel, unless there is an imbalance between main tanks or fuel is low in either main tank. After canceling the FUEL CONFIG light, monitor fuel quantity indications and accomplish the appropriate non-normal procedure if a main tank imbalance or main tank low fuel quantity occurs.

Note

In a low fuel situation, both center tank pumps may be selected ON and all center tank fuel may be used.

If the main tanks are not full, the zero fuel gross weight of the airplane plus the weight of center tank fuel may exceed the maximum zero fuel gross weight by up to 5,000 pounds (2,300 kilograms) for takeoff, climb, cruise, descent, and landing, provided that the effects of balance (CG) have been considered.

If a center tank fuel pump fails or indicates low pressure with fuel in the center tank, accomplish the FUEL PUMP non-normal procedure.

When defueling center or main wing tanks, the Fuel Pump Low Pressure indication lights must be monitored and the fuel pumps positioned to OFF at the first indication of fuel pump low pressure. Defueling with passengers on board is prohibited.

The limitations contained in this AD supersede any conflicting basic airplane flight manual limitations."

Alternative Methods of Compliance

(f)(1) An alternative method of compliance or adjustment of the compliance time that provides an acceptable level of safety may be used if approved by the Manager, Seattle Aircraft Certification Office (ACO), FAA. Operators shall submit their requests through an appropriate FAA Principal Operations Inspector, who may add comments and then send it to the Manager, Seattle ACO.

(2) Alternative methods of compliance, approved previously in accordance with AD 2002-19-52, amendment 39-12900, are not considered to be approved as alternative methods of compliance with this AD.

NOTE 2: Information concerning the existence of approved alternative methods of compliance with this AD, if any, may be obtained from the Seattle ACO.

Special Flight Permits

(g) Special flight permits may be issued in accordance with sections 21.197 and 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199) to operate the airplane to a location where the requirements of this AD can be accomplished.

(h) **AD 2002-24-51, issued on November 23, 2002, becomes effective upon receipt.**

For further information contact: Bernie Gonzalez, Aerospace Engineer, Propulsion Branch, ANM-140S, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue, SW., Renton, Washington 98055-4056; telephone (425) 227-2682; fax (425) 227-1181.

Issued in Renton, Washington, on November 23, 2002.

Original signed by:

Ali Bahrami, Acting Manager,
Transport Airplane Directorate,
Aircraft Certification Service.